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A REVIEW OF THE AMERICAN SPECIES OF THE GENUS *HEMIRHAMPHUS*.

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The American species of the genus *Hemirhamphus* are in a condition of great confusion. In this paper we have endeavored to give the synonyms of those species which seem to be valid, with an analysis of their specific characters. The paper is based on specimens belonging to the Indiana University, and to the United States National Museum, all of them collected by Professor David S. Jordan on the coast of Florida and at Havana.

This collection comprises three of the four Atlantic species admitted by us, the published descriptions indicating the existence of another (*H. balao*), as yet unknown to us.

Euleptorhamphus longirostris is not here mentioned, as we regard it as the type of a genus distinct from *Hemirhamphus*.

We are very much indebted to Professor Jordan for use of his library and for valuable aid.

Analysis of American species of the genus Hemirhamphus.

- a. Anal fin about as long as dorsal and opposite it, its rays 14 to 16; sides with a distinct silvery band; last ray of dorsal not produced in a filament.
- b. Ventrals inserted about midway between base of caudal and posterior margin of eye; dorsal and anal fins scaly; lat. l. 53 to 56.
- c. Length of mandible (from tip of upper jaw) not longer than rest of head; body and head comparatively robust; D. 15; A. 16. *unifasciatus*. 1.
- cc. Length of mandible (from tip of upper jaw) not shorter than rest of head; body comparatively slender. D. 14; A. 15. *roberti*. 2.
- bb. Ventrals inserted midway between base of caudal and gill openings; dorsal and anal fins not scaly; lat. l. 63; D. 14; A. 14. *rosæ*. 3.

aa. Anal fin about $\frac{3}{8}$ length of dorsal, its insertion behind that of dorsal, its rays 11 or 12; sides without distinct silvery band; last ray of dorsal produced in a short filament.

d. Scales comparatively large, about 53 in lateral line; upper lobe of caudal bright orange in life. D. 14; A. 12. *pleii.* 4.

dd. Scales comparatively small, about 63 in lateral line (*Valenciennes*); upper lobe of caudal dirty violet (*Poey*); D. 11-14; A. 11-12 (*Poey*). *balao.* 5.

1. *Hemirhamphus unifasciatus*.

Hemirhamphus unifasciatus Ranzani, Nov. Comm. Acad. Sci. Inst., Bonon, v, 1842, 326, Taf. 25 (Brazil); Günther, Cat. Fish. Brit. Mus., vi, 1866, 262 (in part; West Indies; Rio Janeiro); Cope, Trans. Amer. Phil. Soc., 1871, 481 (St. Martin's); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 924 (Panama; no description). (Not *H. unifasciatus* of most American writers.)

? *Hemirhamphus picarti* Cuv. & Val., Hist. Nat. Poiss., xix, 1846, 25 (Africa).

Hemirhamphus richardi Cuvier & Valenciennes, Hist. Nat. Poiss., xix, 1846, 26 (Antilles; Cayenne; Bahia; Rio Janeiro).

Hyporhamphus tricuspidatus Gill, Proc. Acad. Nat. Sci. Phila., 1859, 131 (Barbadoes).

Hemirhamphus fasciatus Poey, Memorias, ii, 1860, 299 (Cuba; not of Bleeker).

Hemirhamphus poeyi Günther, Cat. Fish. Brit. Mus., vi, 1866, 262 (on *H. fasciatus* Poey); Poey, Syn. Pisc. Cub., 1868, 383 (Cuba); Poey, Enumeration Pisc. Cub., 1875, 121 (Cuba); Jordan & Gilbert, Proc. U. S. Nat. Mus., 1882, 273, 381 (Panama).

Habitat.—Both coasts of tropical America and West Indies; Panama; Cuba; West Indies; Antilles; St. Martin's; Rio Janeiro; Cayenne; Bahia.

This species is known to us from many specimens collected by Professor Jordan at Havana and Key West. Young examples are more slender than the old ones, and have the lower jaw proportionately shorter. Both young and old are, however, more robust, shorter and thicker in every part than specimens of *H. roberti* of the same size. Except this difference of form, we are unable to detect any distinction whatever. We have no doubt, however, that the two are really different.

The figure and description of Ranzani represents this species much better than *H. roberti*. We therefore retain for it his original name. *H. richardi* Cuvier & Valenciennes is evidently the same, and *H. picarti* is at least very similar. Gill's *Hyporhamphus tricuspidatus* is not very satisfactorily described, but as its author afterwards refers to it as probably identical with *H. richardi*, and as the description and locality best fit that species, we have so considered it.

Our Havana specimens leave no doubt that *H. fasciatus* and its synonym, *H. poeyi*, are based on this species. Its lower jaw is, however, longer than Poey describes, and but for this Dr. Günther would evidently have referred Poey's description to *H. unifasciatus*. Specimens collected by Captain Dow, at Havana, show that this is one of the species found on both sides of the isthmus.

2. *Hemirhamphus roberti*.

Hemirhamphus roberti Cuvier & Valenciennes, Hist. Nat. Poiss., xix, 1846, 24 (Cayenne); Günther, Cat. Fish. Brit. Mus., vi, 1866, 263 (New Orleans).

Hemirhamphus unifasciatus Cope, Proc. Acad. Nat. Sci. Phila., 1870, 119 (Newport, R. I.; Jordan and Gilbert, Proc. U. S. Nat. Mus., 1878, 283 (Beaufort, N. C.), no description; Goode, Proc. U. S. Nat. Mus., 1879, 116 (Name only); Jordan, Proc. U. S. Nat. Mus., 1880, 20 (San Sebastian River, Fla.); Jordan, Proc. U. S. Nat. Mus., 1880, 22 (St. John's River, Fla.), no description; Jordan and Gilbert, Proc. U. S. Nat. Mus., 1881, 274 (Guaymas); Jordan and Gilbert, Bull. U. S. Fish Comm., 1882, 106 (Mazatlan); Jordan and Gilbert, Proc. U. S. Nat. Mus., 1882, 588 (Charleston, S. C.); Jordan and Gilbert, Proc. U. S. Nat. Mus., 1882, 356 (Cape San Lucas); Jordan and Gilbert, Proc. U. S. Nat. Mus., 1882, 262 (Pensacola, Fla.); Goode and Bean, Proc. U. S. Nat. Mus., 1882, 239 (Gulf of Mexico), no description; Jordan and Gilbert, Syn. Fish. N. A., 1882, 376.

Habitat.—Both coasts of America, chiefly north of the tropics: Beaufort; Charleston; Pensacola, San Sebastian River; Cedar Keys; New Orleans; Cayenne; Mazatlan; Guaymas; Cape San Lucas.

All the specimens of *Hemirhamphus* thus far taken on the Atlantic Coast of the United States, north of the Florida Keys (except one of *H. pleii*), belong to a species differing from the West Indian *unifasciatus*, in the slenderness of body and in the greater length of the lower jaw. This is evidently the *H. roberti*

of Günther and the *H. unifasciatus* of all the American local lists. The *H. roberti* of Cuvier and Valenciennes is very scantily described. It is, however, related to *H. unifasciatus*, and is said to have the lower jaw longer than in *H. richardi* or *H. picarti*. We therefore identify it with this species, with this element of doubt, that there is no other record of the slender form south of Central Florida. This species occurs also in the Gulf of California. Specimens from Charleston and from Mazatlan are described by Jordan and Gilbert, as having the anterior rays of dorsal and anal, and the upper and lower rays of caudal jet-black, but no other difference from the usual form was noted.

3. *Hemirhamphus rosæ*.

Hemirhamphus, sp. incert., Jordan & Gilbert, Proc. U. S. Nat. Mus., 1880, 29 (San Diego).

Hemirhamphus rosæ Jordan & Gilbert, Proc. U. S. Nat. Mus., 1880, 335 (San Diego, Cal.); Jordan and Gilbert, Proc. U. S. Nat. Mus., 1880, 457 (San Pedro, San Diego); Jordan and Jouy, Proc. U. S. Nat. Mus., 1881, 13 (San Diego); Jordan and Gilbert, Proc. U. S. Nat. Mus., 1881, 43 (San Diego); Bean, Proc. U. S. Nat. Mus., 1881, 316 (name only); Jordan and Gilbert, Syn. Fish. N. A., 1882, 376.

Habitat.—Pacific Coast of United States; San Diego; San Pedro.

We have nothing to add to the account of this species.

4. *Hemirhamphus pleii*.

Hemirhamphus marginatus Le Sueur, Jour. Acad. Nat. Sci. Phila., ii, 1823, 135 (Lesser Antilles; not of Forskål).

Hemirhamphus pleii Cuvier & Valenciennes, Hist. Nat. Poiss., xix, 1846, 29 (Antilles; Martinique; San Domingo); Günther, Cat. Fish. Brit. Mus., vi, 1866, 269 (Jamaica; Dominica; Bahia; West Indies); Bean, Proc. U. S. Nat. Mus., 1880, 103 (Bermudas).

Hemirhamphus filamentosus Poey, Syn. Pisc. Cub., 1868, 382 (Cuba); Poey, Enum. Pisc. Cub., 1875, 121 (Cuba).

Hemirhamphus brasiliensis Jordan & Gilbert, Syn. Fish. N. A., 1882, 902 (Hunger's Wharf, Virginia; not of Günther).

Habitat.—Atlantic Coasts of America and West Indies, Virginia to Brazil. Virginia; Martinique; San Domingo; Jamaica; Dominica; Bermudas; Bahia.

This species is very abundant at Key West, where it is known as *Balao*, and at Havana, where it is called *Escribano*. It occa-

sionally ranges northward, a specimen from Virginia being in the National Museum. This is evidently *Hemirhamphus filamentosus* of Poey. The scanty description of *H. pleii* of Cuvier and Valenciennes seems to refer to it, at least in large part, as this is the only species so far as known that has the upper lobe of the caudal red or yellow in life. This is also the *H. marginatus* of Le Sueur, but not the original *H. marginatus* of Forskål.

5. *Hemirhamphus balao*.

? *Esox maxilla inferiore producta* Brown, Jamaica, 1756, 443, t. 45, f. 2 (Jamaica).

Esox brasiliensis Linnæus, Syst. Nat., ed. 10, 1758, 314 (in part; reference to Brown; not *Timucu* Marcgrave, which should be regarded as the Linnæan type, as having given rise to the name *brasiliensis*).

Hemirhamphus brasiliensis Günther, Cat. Fish. Brit. Mus., vi, 1866, 270 (based on *Hemirhamphus browni* Cuv. and Val.); ? Jordan and Gilbert, Proc. U. S. Nat. Mus., 1882, 109 (Panama; name only); ? Jordan and Gilbert, Proc. U. S. Nat. Mus., 1882, 624 (Panama).

Hemirhamphus balao Le Sueur, Jour. Acad. Nat. Sci., Phila., ii, 1823, 135 (Lesser Antilles).

Hemirhamphus browni Cuvier & Valenciennes, Hist. Nat. Poiss., xix, 1846, 13 (Guadaloupe; Martinique).

Hemirhamphus macrochirus Poey, Memorias, ii, 1858, 299 (Cuba); Poey, Enum. Pisc. Cub., 1875, 121 (Cuba).

Habitat. — Coasts of tropical America and West Indies; Jamaica; Lesser Antilles; Guadaloupe; Martinique; Cuba; Panama.

We have not seen this species and are not entirely certain of its distinction from *H. pleii*. In *Hemirhamphus pleii* the upper lobe of the caudal is always bright orange-red and the number of scales in a longitudinal series is about 56. The description of *H. balao*, *H. browni* and *H. macrochirus* all refer to a fish with smaller scales, with both lobes of the caudal bluish, and *H. browni* and *H. macrochirus* have smaller scales than *H. pleii*. The specimens obtained by Professor Gilbert at Mazatlan, Panama, we refer provisionally to this species, but they may prove different on actual comparison. The oldest tenable name for this species seems to be *H. balao* Le Sueur.

Esox brasiliensis Linnæus is based on Brown's description of a *Hemirhamphus* from Jamaica, and Marcgrave's account of a

Tylosurus from Brazil. The name *brasiliensis* is evidently suggested by the latter, which should therefore retain it as specific name. It does not appear also certain as to which species of *Hemirhamphus* is described by Brown.

TABLE OF MEASUREMENTS.

(In hundredths of length to base of caudal.)

LOCALITIES.	<i>H. unifasciatus.</i>					<i>H. roberti.</i>				<i>H. rosæ.</i>	<i>H. pletti.</i>				
	Key West.	Key West.	Key West.	Key West.	Key West.	Cedar Keys.	Cedar Keys.	Cedar Keys.	Cedar Keys.	San Diego.	Key West.	Key West.	Key West.	Key West.	Key West.
Length of specimen, in inches.	7.45	8.05	7.56	5.45	5.2	5.75	6.1	5.85	5.2	4	8.8	8.4	10.3	11.2	8.55
Head, from tip of upper jaw to gill opening. (Hundredths)	21½	21½	22	23	22½	22½	23	23	23½	20	18¼	18½	19½	18½	19
Head, from tip of lower jaw to gill openings.	42½	40½	42	43	43½	47	47½	47½	48½	50	43	44½	41½	42	41½
Distance of ventrals from tip of snout.	57	59	57	59	57	57	60	58	59	63	53½	54	54½	52	52½
Distance of dorsals from tip of snout	78	78	77½	78	78	77	79	78	79	76	61½	62	60½	59	60
Length of pectorals.	13	13¼	14	14	14	14	14	14	14½	11½	14	14	13½	14	14
Depth of fish at ventrals.	14	14½	14	13½	14	13	13	12	13	11½	12	11½	12½	18½	12½
Thickness of fish at ventrals.	10	11	10½	9	9½	8½	8½	8½	8½	8	6	6	6	6	6
Least depth of caudal peduncle	5½	6	6	6	6	5	5	5	5	4½					
Length of base of dorsals.	14½	14	14	14	14	14	14	13½	14½	16	11	12	12	11	12
Diameter of eye.	5¼	5½	5½	5½	5½	5	5½	5	5½	5	4½	4½	5	4½	4½
Width of interorbital.	6	6	6	6	6	5½	5½	5½	6	6	4½	4½	5	4½	4½
Breadth of head at posterior end of maxillary.	5½	5¼	5¼	5½	5¼	4½	5	5	5½						
Breadth of beak at tip of upper jaw.	3½	3½	3½	3½	3½	3	3	3	3¼						